

XXIII. PRELIMINARY DESCRIPTION OF A FRESHWATER MEDUSA FROM THE BOMBAY PRESIDENCY.

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Mr. F. H. Gravely of the Indian Museum and Mr. S. P. Agharkar of the Elphinstone College, Bombay, have recently obtained many specimens of the medusa referred to on p. 144, vol. lxxxvii of *Nature*. The following preliminary description is based on an examination of these specimens, which are several hundreds in number and come from the Yenna and Koyna valleys in the Satara district of the Bombay Presidency.

LIMNOCNIDA INDICA, sp. nov.

This medusa is closely allied to *L. tanganyicae* (Bohm)¹ and *L. rhodesiae*, Boulenger,² but differs from both in the arrangement of its tentacles and sense-organs.

Dimensions.—The smallest specimen (fig. 1) I have seen is about 1·75 mm. in diameter and has probably been, at any rate when in a state of contraction, at least as deep as broad. Full-grown medusæ are 15 mm. in diameter and almost three times as broad as deep.

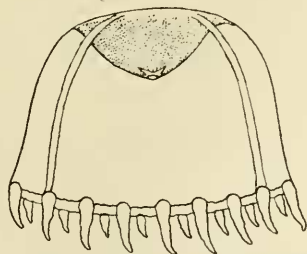


FIG. 1.—Young medusa of *Limnocythia indica*.

Umbrella.—The umbrella is very shallow and almost flat on the dorsal surface in the adult; in the young it is distinctly flattened above but not so broadly as in the adult.

¹ Günther (R.T.), *Ann. Mag. Nat. Hist.* (6) xi, p. 269 (1893); *Quart. Journ. Micro. Sci.* xxxvi, p. 271 (1894); *P.Z.S.*, 1907 (ii), p. 643; Browne in Graham Kerr's *The Work of John Samuel Budgett*, p. 471 (1907); Boulenger (C.L.), *Quart. Journ. Micro. Sci.* lvii, p. 83 (1911).

² Boulenger (C.L.); *tom. cit.*, p. 427 (1912).

Manubrium.—The manubrium in most of Mr. Gravely's and Mr. Agharkar's specimens has the saucer-like form characteristic of the genus, consisting merely of a shallow ring and opening nearly as wide as the velum. In some few adult individuals, however, it is in a more or less contracted condition, while in one young one (fig. 1) its margin has been drawn together in such a way as to close the mouth almost completely, leaving only a minute star-shaped aperture. Mr. Gravely informs me that even the largest medusæ are quite capable of keeping their mouths closed, so long as they are in good health.

Gonads.—The gonads surround the manubrium as in other members of the genus. In the male the testis forms a uniform opaque white ring, but in the female the ring is grooved vertically at frequent intervals so that it has a crimped appearance. The grooves extend from the upper part of the manubrium downwards

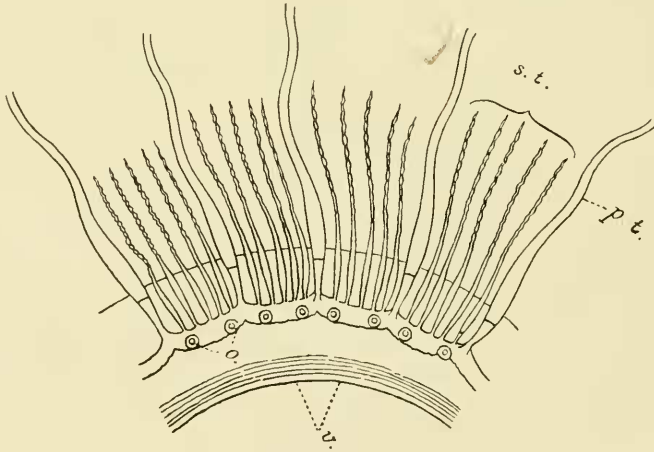


FIG. 2.—Tentacles and sense-organs as seen from below, o.=otocyst: p. t.=primary tentacle; s.t.=secondary tentacle; v.=velum.

but do not reach its distal margin. They do not form distinct loculi in the ovary, for the ova, which are arranged horizontally, extend across them. A number of minute greenish cells (possibly symbiotic algae) exist in the outer covering of the ovary and give it a faint yellowish tinge. The eggs are very small; when ripe and apparently just about to be emitted from the ovary they are circular and from 0.04 to 0.06 mm. in diameter. At an earlier stage they are produced and pointed at one side.

Tentacles.—The tentacles appear, at any rate in the adult, to have a much more definite arrangement (fig. 2) than is the case either in *L. tanganyicae* or *L. rhodesiae*. In general structure they agree with the tentacles of these species. They may be divided at sight into two series that may be called primary and secondary; those of each series having a distinctive structure, position and number. The primary tentacles are much stouter at the base and

also much longer than the secondary ones. They extend upwards from the base through the jelly of the bell for a short distance and on emergence therefrom lie parallel to its external surface, each in a shallow groove, for about twice the distance for which they are enclosed in the jelly. This groove extends to the edge of the umbrella. On its termination the tentacle bends outwards and upwards and then downwards. At the point at which it does so there is only a very slight prominence on the surface of the umbrella. The base of the primary tentacle is both constricted from side to side and flattened dorso-ventrally. On the dorsal surface, where it is in contact with the mesogloea below the ectoderm of the bell, its endoderm contains numerous small polygonal cells of a yellowish colour due to their thickened walls.

The secondary tentacles are not only much shorter but also more nearly cylindrical and equal than the primary ones. They project practically straight out from their base, which is not, or only to a very slight extent, enclosed in the jelly.

The full number of tentacles is 384. Every primary tentacle is followed by five secondary ones arranged in a straight line with their bases a little further from the velum.¹ There are thus 64 series of six tentacles each, each consisting of one primary and five secondary tentacles. The radial tentacles are followed by five secondary tentacles just as other primary tentacles are.

It might be possible to divide the primary tentacles into several series by their length and in the adult medusa the radials are distinctly longer than the others; but the differences in this respect are slight and apparently unimportant. In the young medusa 1.75 mm. in diameter only two series can be distinguished and the radial tentacles are very little if at all longer than the others. At this stage there are 24 primary tentacles and each is followed by a single secondary one, which is distinguished not only by its smaller size but also by being placed a little lower on the edge of the bell as seen from the side or above.

Sense-organs.—The otocysts are comparatively large, at least equalling the base of the largest tentacles in diameter. They also have a very definite arrangement in the adult. Every set of five secondary tentacles has two otocysts at its base and these two are separated from the next pair by the base of a primary tentacle and by an outward emargination of the inner edge of the ring of thickened tissue at the base of the tentacles. It is always quite clear, in well-preserved specimens, that the otocysts are not situated at the base of the primary tentacles and are not surrounded by anything like a tentacular bulb. In the young medusa already alluded to there are only three fully formed otocysts in each quadrant, *i.e.*, only twelve in all; while in an older medusa measuring 3.25 mm. in diameter there are five in each quadrant.

¹ Owing to the fact that the base of the primary tentacle is embedded in the jelly, this tentacle, unless a very careful examination is made from below, has the appearance of arising further from the velum than the secondary tentacle.

In the adult medusa the total number is 128. The sense-organs have the structure characteristic of *Limnocrnida*.

Nematocysts.—The nematocysts resemble those of other species of *Limnocrnida* both in shape and in arrangement. Round the margin of the bell they form a "nettle-band," in which they are found in various stages of development, always lie parallel to the external surface and never possess cnidocils. In the basal part of the primary tentacles they have the same position and still lack cnidocils. In this region they are very numerous. From a point a short distance beyond that at which the tentacle projects from the edge of the bell, however, they are arranged in very definite papillae. In these they stand out almost vertically from the surface and are provided with cnidocils. On the distal part of the tentacle the papillae are arranged in transverse rings round it, each ring consisting of four papillae. On the secondary tentacles the papillae extend nearly to the base.

Types (many specimens from Medha, Yenna valley, between Mahableshwar and Satara). No. Z.E.V. $\frac{51.01}{7}$ Ind. Mus. (F. H. Gravely: May, 1912).

Distribution.—Pools in streams in the Western Ghats that finally enter tributaries of the Kistna river, Satara district, Bombay Presidency.

On the manubrium of specimens from Tambi in the Koyna valley I found numerous examples of the Infusorian *Trichodina pediculus*, Ehrenberg, a species which in Europe lives symbiotically on *Hydra* and other aquatic organisms.